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Implementation of SMS fever surveillance in the Philippines

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Background: The Cebu City Health Department (CHD) established paper-based fever surveillance for dengue in year 2000. CHD utilized health volunteers to identify fever cases in their neighborhood and refer cases to Barangay Health Centers (BHCs). An aggregate report was submitted to CHD on a weekly to monthly basis. However, this resulted in identification of outbreaks only several weeks after onset. We assisted in modifying the existing paper-based fever monitoring into a short message service (SMS)-based fever surveillance system. We describe challenges in implementation and its preliminary results.

Methods: Providers at BHCs sent fever cases daily via SMS to CHD hotline. Texted variables included clinic date, age, sex and fever syndromes which are coded. Providers received an auto-reply for successful transmission. An auto-reply for erroneous data prompted providers to resend in prescribed format or provide complete data.

The SMS Fever Surveillance system was implemented in all of the 80 BHCs that comprised the CHD. In 2011, the surveillance system was based on data collected from seventy-five (75) out of 80 BHCs. All 50 urban BHCs in the lowlands and 30 rural BHCs in mountain areas participated in the surveillance. The surveillance was representative of the city's population of about 822,628 people. Data, collected on a daily basis between July 15, 2010 and December 29, 2011 from the 75 BHCs corresponded to 7694 fever cases. Valid one-time texts made up 82% of all texts. Data was transmitted within 24 hours of clinic visit in 62% of cases, 48 hours in 8% of cases and 72 hours in 4% of cases.

Conclusion: This is the first city-wide SMS-based fever syndromic surveillance established in the Philippines. Mobile phone SMS is an effective tool to rapidly transmit cases for near "real-time" data analyses to detect outbreaks. An auto-reply may increase timeliness, accuracy and completeness of data. In addition, SMS-based fever surveillance in conjunction with hospital-based reporting can detect health events of international importance. Future interventions might include rapid laboratory testing for selected pathogens to determine etiologies of acute febrile illness.

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Respiratory virus surveillance in hospitalized pneumonia patients on the Thailand-Myanmar border

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Background: Pneumonia is a significant cause of morbidity and mortality in the developing world, especially in children. Viruses, in particular influenza and respiratory syncitial viruses (RSV), contribute significantly to the burden of pneumonia, although data for low-income and tropical countries are scarce. We characterized the epidemiology of respiratory virus infections among Karen refugees living on the Thailand-Myanmar border through laboratory-enhanced, hospital-based surveillance.

Methods: Maela camp provides shelter for >40,000 refugees. Inside the camp, a humanitarian organization provides free inpatient care in a 158-bed inpatient department (IPD). Between 1st April 2009 and 30th September 2011, all patients admitted to the IPD with a clinical diagnosis of pneumonia were invited to participate in surveillance. Clinical symptoms and signs were recorded and a nasopharyngeal aspirate (NPA) collected. NPAs were tested for adenoviruses, human metapneumovirus (hMPV), influenza A & B, and RSV by real-time RT-PCR.

Results: Among 2,231 admitted with a clinical diagnosis of lower respiratory tract infection,708 (31.7%) patients participated in surveillance. The median age was 1 year (range: 0-70), and 90.4% were aged <5 years. 57.3% were male and 42.7% female. Patients presented at a median of 4 days of illness (IQR: 2-6). 284/701 (40.5%) patients reported taking an antibiotic in the two weeks prior to admission, most commonly amoxicillin (270/283, 95.4%).

At least one virus was detected in 53.7% (380/708) of patients. RSV was detected in 176/708 (24.9%); an adenovirus in 133/708 (18.8%); an influenza virus in 68/708 (9.6%); and hMPV in 33/708 (4.7%). Twenty eight multiple viral infections were identified, most commonly adenovirus plus another virus. RSV was more likely to be detected in children <5 years ($p<0.0001$) and influenza viruses in patients $\geq$5 years ($p=0.001$).

IPD treatment was documented in 702/708 cases; all but one patient received antimicrobials, most commonly a beta-lactam (amoxicillin/ampicillin +/- gentamicin in 664/701, 94.7%).

Conclusion: Viral nucleic acid was identified in the nasopharynx of over half of patients admitted with clinically diagnosed pneumonia. Immunisations targeting common respiratory viruses are likely to significantly reduce the incidence of pneumonia in children living refugee camps and similar settings. Immunisation may also result in reduced antimicrobial consumption.

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